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CALIFORNIA UNIV BERKELEY
FINAL REPORT ON CONTRACT N00014-75-C-0151, (U)
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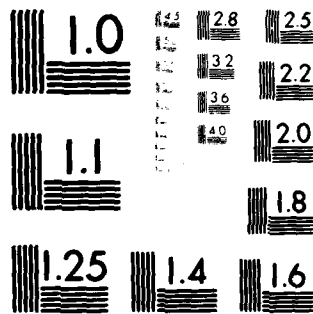
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

UNIVERSITY OF CALIFORNIA, BERKELEY

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SANTA BARBARA • SANTA CRUZ

COLLEGE OF ENGINEERING
MECHANICAL ENGINEERING

BERKELEY, CALIFORNIA 94720

December 14, 1979

Mr. R. Gracen Joiner
Arctic & Field Project Programs
Office of Naval Research
Department of the Navy
Arlington, VA 22217

Dear Mr. Joiner:

Enclosed please find three copies of the Final Report on Contract
N00014-75-C-0151. *new*

With best regards.

Sincerely yours,

M. Holt
M. Holt

MH:ss

Encls.

cc: Mr. E. Keith
Campus Research Office
N. Caputo, ORS



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Final Report *CR*
Contract N00014-75-C-0151

Principal Investigator *M. Holt*

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Justification	
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During the last year ~~of this Contract~~ the investigation of the Upper Critical Depth Effect ^{was} ~~has been~~ completed. This phenomenon arises in ocean surface waves generated by spherical explosions which are detonated at small depths below the surface. It ^{was} ~~has been~~ observed that when such an explosion is centered at a below surface depth equal to approximately half the charge radius, the amplitude of the surface wave generated is an order of magnitude larger than the amplitudes corresponding to depth larger than this.

Theoretical confirmation of this effect ^{was} ~~has been~~ one of the principal objectives of work supported under the Contract. In 1978 two papers were published (by Falade and Holt) which gave a theoretical justification of the experimental result. The papers were based mainly on a method of perturbation of similarity solutions in finite amplitude surface wave theory. This work was reported in earlier annual reports.

During the last year the equations of motion governing finite amplitude surface wave propagation were solved by numerical, finite difference, methods rather than perturbation methods. Two methods, previously applied to Gas Dynamics Problems, were used, the first due to Godunov (described in Chapter II of Holt's book) and the second, more recent, due to Glimm. Both methods proved suitable for application to surface wave problems and both calculations provided further confirmation of the Upper Critical Depth Effect. In addition, in this final period, both the Godunov and Glimm methods were used to calculate the characteristics of the underwater explosion generating the waves.

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During the past year Professor Holt gave two lectures related to this work:

1. International Colloquium on Gas Dynamics of Explosions and Reactive Systems, 20-24 August 1979, Göttingen, W. Germany, "Large Amplitude Ocean Surface Waves Generated by Near Surface Explosions" (with Kon-Ming Li). This is to be published in the Colloquium Proceedings.
2. Lecture at the University of Poitiers, France, 14 November 1979, "Application of Numerical Methods to Surface Wave Problems."

Two Ph.D. students have been working on the contract this year:

- (1) Kon-Ming (Gary) Li; (2) Jolen Flores.

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